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EXECUTIVE SUMMARY

The Center for the Courthouse Program is the General Service Administration's central reporting body for the Federal Courthouse Construction Program. One of its primary duties is to establish Cost Benchmarks. As a result of the Courthouse Construction Benchmark Refinement Contract ("the Benchmark Study") concluded in 2002, the existing Courthouse Benchmarks were updated based upon the detailed analysis of recently constructed Federal Courthouses. An evaluation of the differential costs related to the height of Federal Courthouses was also carried out, and the cost impact of new security mandates put in place following the Oklahoma City tragedy was also studied. The results were incorporated into the revised Cost Benchmarks.

The intent of this manual is to help project managers monitor Courthouse designs and keep them within the approved budgets. It will assist project managers understand the composition of the Cost Benchmark numbers, and provide an insight into what drives cost in a typical project. It also provides guidance in what to look for when reviewing construction cost estimates.

It is first necessary to understand what benchmark costs are, why they are important, and how they are used. By definition, a benchmark is a "standard or point of reference in measuring or judging quality, value, etc " The Courthouse Cost Benchmarks have been calculated based upon standards of space and quality established in existing Federal Courthouses and the value associated with them. The Benchmark Costs then provide the ability at high level to accurately forecast project costs, and to develop realistic budgets. Furthermore, projects in planning and design can be measured and compared against the Cost Benchmarks to ensure that they are consistent with the established standards and compatible with the budget.

Although several cost drivers are discussed in this manual, the need to carefully manage program cannot be emphasized strongly enough. "Program Creep," as it is sometimes described, is simply the amount of additional space that gets translated into plans beyond what is stipulated in the Program of Requirements. This, plus inefficient planning of non-usable space, will invariably be the major contributor to potential cost over-runs. Project managers are urged to carefully review plans, particularly the early design submittals, to ensure this does not occur.

Other useful parameters are identified in the manual and will serve to provide additional benchmarks for project managers to use in reviewing submittals.

Finally, a helpful summary of items included in the benchmark pricing is attached.

This document should be read in conjunction with the Courthouse Project Handbook, the General Construction Cost Review Guide for Federal Facilities, and PBS 3440.5 Project Estimating Requirements, plus PBS Space and Facility requirements, P100.

7.1 COURTHOUSE CONSTRUCTION BENCHMARK REFINEMENT STUDY

7.1.1 Objectives

The Courthouse Management Group (CMG), now the Center for the Courthouse Program (PCC), is the General Service Administration's central reporting body on the national Courthouse construction program. One of its primary duties is to establish cost benchmarks for proposed courthouses throughout the nation.

In 2000, GSA commissioned The Courthouse Construction Benchmark Refinement Contract ("the Benchmark Study") with the intent of refining and updating the existing PCC courthouse benchmark cost process and develop a core and shell / interior fit-up system based upon the cost analysis of four fully designed case studies. In addition, an evaluation of realistic cost modifiers relative to low-rise, mid-rise, and high-rise courthouses was carried out. Finally, an evaluation of the probable cost impact of incorporating security mandates, put in place subsequent to the Oklahoma City tragedy, was incorporated into the study.

7.1.2 Methodology

In the first instance, a pilot project was completed. Construction contract documents for the Omaha Federal Courthouse were delineated into the five CMG designated space types in accordance with the BOMA / ANSI standard method of measurement. Cost estimates were prepared for Above Grade Core / Shell, Below Grade Core / Shell, and Tenant Improvements for each of the space categories. Unit costs/GSF were derived from each estimate. The cost estimates were completed as if the building had been built in Washington DC and represented the fair market value, with bids being received in October 2000. Pricing was based upon receiving competitive bids from a minimum of five qualified general contractors, and a minimum of three bids for all sub-contracted work.

Subsequent to the pilot project, three additional courthouse projects in Laredo, Texas, Jacksonville, Florida, and Tucson Arizona were similarly delineated and costed. The projects were carefully selected to provide a variety of floor plate layout, and a mix of low, medium, and high–rise construction. Sensitivity analysis was used to identify the impact of several typical cost drivers, and to develop typical costs for a "Design Guide" quality project. This technique was also used as a basis for deriving recommendations for building height modifiers.

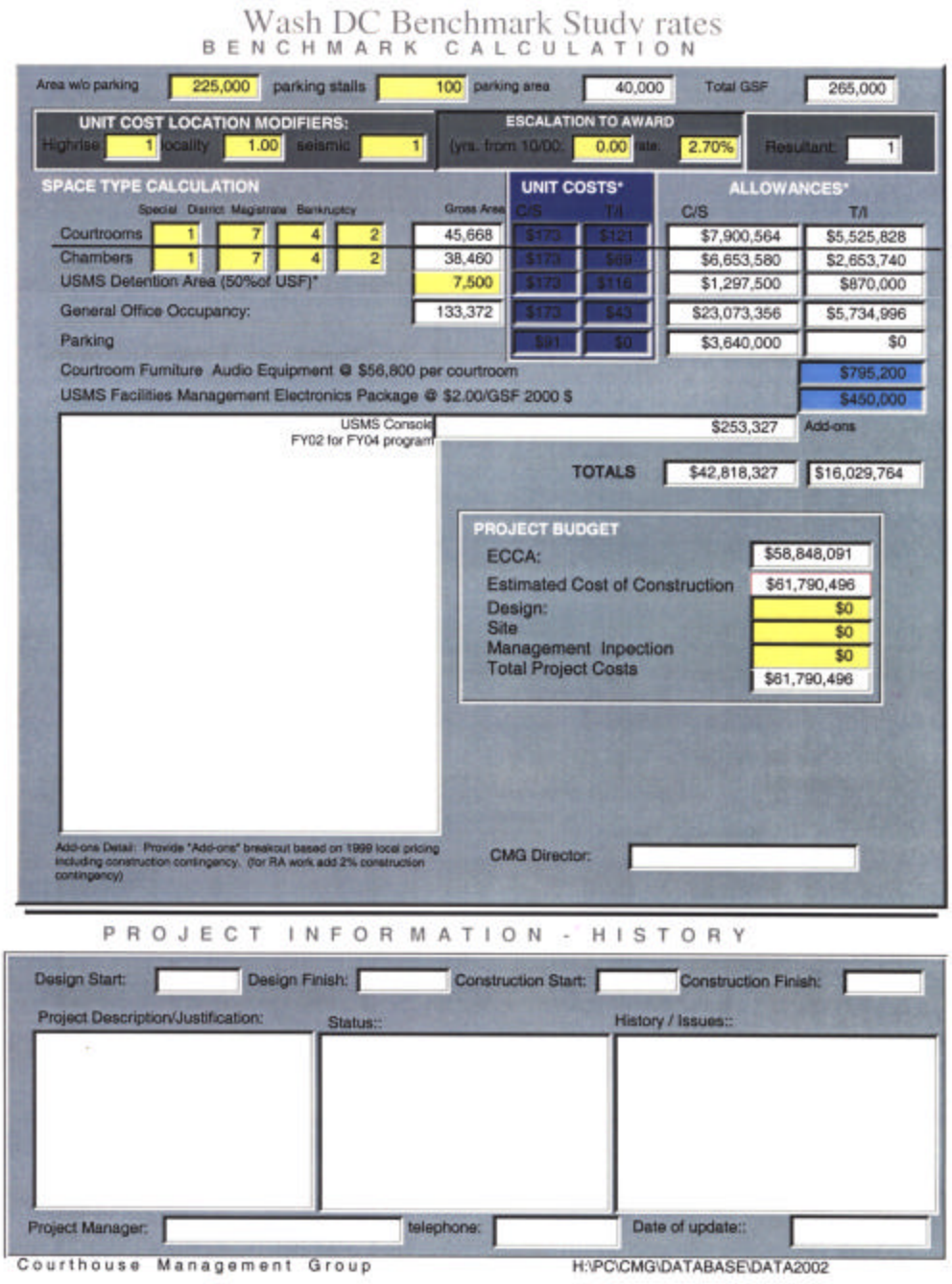
7.1.3 Output

The findings, detailed cost analyses, and recommendations concluded from the study can be found in the complete report "Courthouse Construction Benchmark Refinement Contract, May 2002."

7.2 BENCHMARK PRICING

7.2.1 Benchmark Study Calculation Form.

A sample Benchmark Calculation form for a typical courthouse project for Fiscal Year 04 follows. This shows the changes in the core shell and tenant improvement split and the increases in unit prices as developed from the study.



7.2.2 Location Modifiers.

Location modifiers to make provision for height, geographic location, and seismic control are included in the benchmark pricing calculations.

The Benchmark Study identified mid-rise construction as the norm, and that modifiers of +6% for low-rise and +1% for high-rise projects were appropriate.

The locality modifier also takes the locality index and seismic (geographical) location of a project into account. The location index and seismic location specific factors can be found in the GSA General Construction Cost Review Guide (GCCRG), which is updated each year.

7.2.3 Escalation to Mid-point Construction

The benchmark prices are predicated on an average construction period of 36 months. The Benchmark Study prices were calculated assuming a construction start in October 2000. In accordance with industry practice, escalation was calculated to the mid-point of construction. An annual rate of 3% was used in the Benchmark Study to adjust to current pricing.

7.2.4 Annual Escalation Rate

Escalation rates for estimating purposes may be obtained from the current edition of the GCCRG. However, they are determined for GSA's program each year by The Office of Management and Budget, (OMB).

7.2.5 Core Shell / Tenant Improvement Ratio

The relationship between the Core and Shell and the Tenant Improvement areas is expressed as a ratio: useable tenant area/gross building area. This is also referred to as the building efficiency. The benchmark pricing is based upon an assumed building efficiency of 67%, as stated in "Facility Standards for the Public Building Service" – (page 62).

7.2.6 Raised Floor

Unit pricing for a raised floor throughout the Tenant Improvement areas is included in the Benchmark pricing. An ECCA allowance of $9.00/GSF has been provided in the benchmark TI unit costs for a 12" – 18" raised floor.

7.2.7 Security

The designs of the four model courthouses were commissioned prior to the Oklahoma City tragedy. In order to ensure that sufficient funding was included in future courthouse benchmark pricing to cover the cost of the security mandates that were put in place subsequent to the bombing, a panel of experts was assembled in a "Security Workshop" to identify the probable cost of implementing

these measures. Full details of the findings of the workshop are contained in the Benchmark Study Report. It was calculated that a total cost of $23.00 / GSF was necessary to cover the cost of current security requirements. It was also identified that previous security measures that had been included in earlier benchmark unit pricing accounted for $9.00 / GSF. Therefore, an additional allowance of $14.00 / GSF is now included in the current benchmark pricing. While this allowance of $23.00 / GSF is considered to be adequate, the actual cost of certain provisions (e.g. progressive collapse) can only be determined after the vulnerability assessment has been completed and the overall security costs should be reviewed at that time.

Requirements to harden federal buildings are dependent on the stand-off distance between the potential threat and the building perimeter. These requirements are articulated in a variety of now confidential Government Publications.

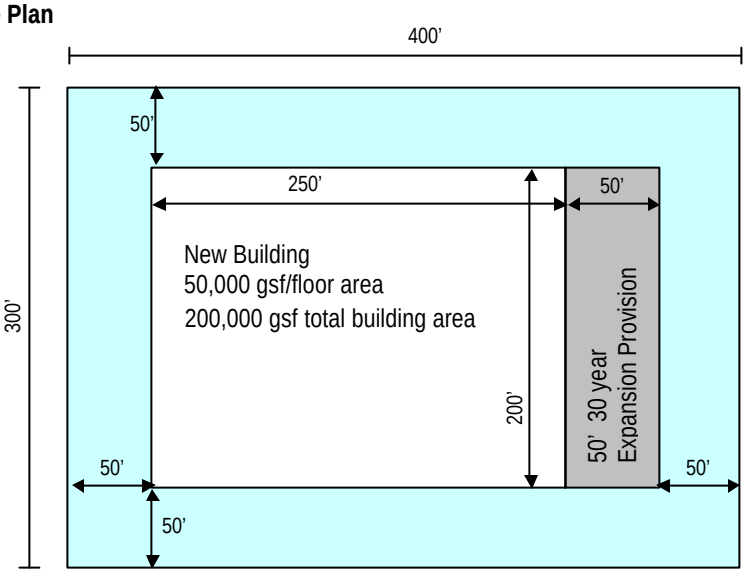
In general, where the site is too small to accommodate optimal stand-off distances, exponentially more money may be required to harden the building perimeter to resist blast events. Therefore the optimal stand-off requirements may limit the selection of potential sites.

7.2.8 Sitework

Site development costs are included in the Benchmark Pricing on an average unit cost per gross square foot of building area ($/GSF) basis.

The benchmark is based on the mid rise model from the Benchmark Study, and includes $7.00/GSF for site development. One way to calculate the amount available to the project is as follows:

Site Plan



Sample of how to calculate the site development allowance in the benchmark.

The benchmark allows for $7.00 per GSF of the building area.

Assuming a 50,000 GSF building floor plate, plus the 30 year expansion provision, and the desired 50' set back, a site that is 300' x 400' will be required. The total site area will be 120,000 SF,

In this example, if the building has a floor plate of 50,000 SF, this would leave 70,000 SF of site to develop. Assuming the building has a total of 200,000 GSF area, then the amount in the benchmark would be 200,000 x $7.00 = $1,400,000 for site development costs. This would be equivalent to $20/ SF of site area for this project. ($1,400,000/70,000 SF)

In this example, if there were 100' setbacks all around the building, then the cost benchmark per SF of site area would reduce to $9.33/SF. However, it should be noted that because of the 100' set back, the requirements for blast protection to the perimeter facades may be reduced or eliminated. This could result in a cost saving of around $10.00 per GSF of building area.

Note that prevention of progressive collapse is always required regardless of setback.

7.2.9 General Contractor's Overhead and Profit

General Contractor's overhead (comprising job site general conditions, home office overhead, and bond) at 10%, and profit at 5% is included as an overall 15 % in the benchmark unit pricing. This is an industry standard provision and may vary depending on such things as market conditions, onerous general conditions requirements etc.

7.2.10 Sustainable Design

An allowance of 2.5 % is included in the benchmark unit pricing to support the cost of Sustainable Design to a Silver LEED rating.

7.2.11 Art In Architecture

An allowance of 0.5% to provide for the Art-In-Architecture program is included in the benchmark unit pricing.

7.2.12 Construction Contingency

A construction contingency of 5% is included in the ECC to provide for unforeseen conditions that may occur during construction. Note that the construction contingency is not part of the General Contractor's bid, but is a component of the overall project budget. The Project Manager must determine when the use of these funds is appropriate.

7.2.13 Special Costs Excluded from Benchmark Pricing.

A list of procurement actions, services, and special building features which are not included in the Benchmark pricing is available in the current edition of the GCCRG.

The following items are ***exceptions*** to that list and are ***included*** in the Benchmark Pricing:

- Blast security features relating to Class C buildings.
- Courtroom furniture and AV equipment ($ 56,800.00 per courtroom) *
- USMS security wiring and equipment (in the area of prisoner movement) ($ 2.00 / building GSF) *
- USMS security console ($ 200,000 plus escalation per courthouse) *
- Raised flooring
- FPS perimeter security wiring and equipment ($ 0.75 / building GSF) *

** Note that these elements are included in the ECCA but are typically procured outside the general construction contract.*

7.3 COST MANAGEMENT

7.3.1 The Design Phase.

Throughout the design phases of a Courthouse project, Project Managers must exert effective cost management controls. In order to achieve this, Project Managers need to be aware of the elements of planning and design that are most likely to impact costs and create the potential for cost over-runs. An Italian economist Wilfred Pareto observed that 80% of the cost of anything resides in approximately 20% of its component parts. This is known as Pareto's Law, and using this logic it is possible to review 80% of a project's cost by evaluating a relatively limited number of "cost drivers".

7.3.2 Typical Cost Drivers.

The following is a list of items which typically impact the ultimate cost of a project, and should be carefully managed:

- Building Efficiency
- Public Space
- Site Conditions
- Structure
- Exterior Closure
- Solid versus Glazed Wall Ratio
- Vertical Circulation
- Mechanical and Electrical Systems
- Bid and Construction Terms.

7.3.3 Building Efficiency

The relationship of useable area (USF) to the gross area (GSF) indicates the efficiency of the building. The target efficiency for Courthouse design is 67%, and any deviation below that target can have a substantial impact on the overall cost of the project.

For example, on a recent judicial facility, (not included in the Benchmark Study), the efficiency calculated at the 100% design phase was 61% against the target efficiency of 67%. The additional 6% non-program space accounted for more than half of the bid over-run.

Conversely, another judicial facility managed to achieve the targeted efficiency while providing a relatively large public atrium space. This was accomplished by using a compact, square building plan, locating the atrium in the middle, and designing very efficient secondary circulation systems. Through careful decision-making that included manipulating the configuration of spaces, this design team created the ability to provide a large public space without exceeding the targeted efficiency.

The efficiency should therefore be measured consistently at each submittal so that it can be monitored against the 67% goal. It is especially important to evaluate the efficiency of each scheme presented at the concept phase so that efficiency and the attendant cost ramifications can be taken into consideration during the design process.

It should be noted that, all other factors being equal, projects that are more efficient appear to cost more on a cost per GSF basis. When a building is configured efficiently, the space that is saved is typically excess circulation space, which is relatively inexpensive space to construct. Although eliminating this inexpensive excess space reduces the overall cost, the cost per GSF increases, since the total cost of the project is being divided by less area.

It is important for the project team to understand this relationship. The value of a project should not be judged exclusively on a cost per GSF basis.

7.3.4 Public Space

Public space includes main public entry lobbies, public elevator lobbies, and waiting areas. This cost driver is of greater consequence in courthouse and other judicial structures where citizens must be able to move freely in and out of the building. The quantity, volume, and configuration of public space impacts cost and building efficiency.

Small buildings typically require proportionately more public space because there is a minimum threshold of public space required to serve a building. Once this threshold is passed, a project can benefit from the economies of scale, needing relatively less public space in proportion to tenant space.

The configuration and size of public space is changing due to enhanced security requirements. The need for magnetometers, and setback from same, at most public buildings changes the entry sequence, elongates and often adds space. The amount of public space should be monitored throughout the design process by identifying and quantifying. The ratio of public space to total project GSF is a useful way of comparing one project to another of equal size and scope.

7.3.5 Site Conditions

Site conditions have a significant impact on the cost of construction. A small site, or one that has low or uneven load-bearing capacity, may require a taller building on a smaller footprint or in a contorted shape. The cost of improving the site in terms of utilities, landscaping, and other site finishes can be monitored by costing these items and dividing them by the site area or by the gross area of the building. The site development allowance in the Benchmark pricing is based upon a cost / GSF of building area. (See example in paragraph 2.8)

Note that GSA is mandated to locate courthouses within the Central Business District (CBD) in most regions which are typically urban areas.

The geological composition of the site is one of the greatest unknowns in forecasting construction cost and is important to understand as early as possible—probably before a site is acquired. A Geotechnical Report will reveal the assumed soil bearing capacity of the site, as well as the presence of rock and existing or adjacent structures. It will identify site locations that are more favorable for construction and the type of foundation systems that are appropriate. The soils conditions will impact the design process in terms of positioning buildings on the site. Trade-offs between alternate design schemes and the attendant site and structural costs should be explored before a scheme is accepted at the end of the concept phase.

Construction can be complicated by inadequate staging areas or other difficult site conditions. Limited ability to deliver materials efficiently or place necessary plant and equipment in dense urban areas will drive up the construction cost.

7.3.6 Structure

In addition to soil conditions, code requirements, dead load requirements, seismic zone, and security considerations influence the structural design of a building. Most often the option of considering more than one structural solution for a project exists. Each should be evaluated in terms of cost. Generally, long-span or longer span schemes in oddly configured buildings are more costly to construct than shorter-span, compact structures.

The relative cost of building in concrete versus steel will vary with different localities, projects, and general contractors. Projects that are constructed of steel can be monitored by evaluating the pounds of steel/GSF and by the cost/ton of steel.

7.3.7 Exterior Closure

The cost of the exterior closure of a project is driven by the amount of skin enclosing the building and the selected material palette.

The most compact geometry a building can achieve is a cylinder. However, constructing curved surfaces is generally impracticable and costly. The next most efficient conventional construction geometry is a cube.

A building that is long and narrow will require more skin than a building that is very compact.

A useful way to monitor the efficiency of the exterior closure is to calculate the wall to floor ratio. This is the total exterior skin area divided by the gross floor area. The smaller the wall to floor ratio, the less quantity of skin built and the more efficient the building configuration. For example, a very compact warehouse building could

have a skin ratio as low as 20 percent. An office building in a city where height restrictions encourage the use of low floor-to-floor heights might have a skin ratio of 30 to 50 percent**.**

Typically, a federal courthouse should have a skin ratio between 45 and 55 percent.

Estimators should note that the configuration of the building perimeter, the height of the building, and the articulation of the façade also affect the amount of finished skin. The articulation takes into account the returns at the windows, doors, pilasters, etc. that require to have finished surfaces. A simple formula can be used to take into account these additional finished areas as follows:

Perimeter x height x modifier (for articulation) = developed area of the exterior.

The modifier for articulation typically ranges from 5% (1.05) for a very smooth, shallow façade to over 25% (1.25) for a building with heavy cornices and deep-set windows. .

7.3.8 Solid Versus Glazed Wall

The cost of the exterior closure is affected by the types and mix of materials selected. The Benchmark Study revealed a broad range in solid to glazed area ratios. The solid glazed ratios varied from 49:51 (producing a more transparent building) to 81: 19 (producing a more opaque building). This relationship will become increasingly more important as security requirements are highlighted and bullet-resistant and /or blast-resistant glazing are incorporated more extensively into Courthouse design. With blast-resistant punched windows costing as much as 10 times more than conventional punched windows, pressure may build to reduce the proportion of glazed area.

Careful cost planning and management will be required to balance the desire for natural day lighting, sustainable design, and openness of Courthouses, (typically characterized by large glazed areas), with security requirements which will necessitate a reduction in glazed areas.

A Fenestration Ratio (area of glazing divided by area of external closure) of 30% -45% was used to develop the Benchmark pricing.

7.3.9 Vertical Circulation

The cost of vertical circulation systems can be monitored by identifying the elevator ratio (total GSF divided by the number of elevators) and by unit cost (total cost of elevators divided by the number of elevator stops). The elevator ratio helps to define whether the quantity of elevators is typical. The cost per stop helps to identify how relatively expensive the system is. Elevator ratios on small buildings

and those with multiple circulation systems will tend to be higher than on larger buildings. Larger buildings benefit by economy of scale.

Most small buildings will require that two elevators be installed for maintenance purposes, even though the population of the building does not otherwise support a second elevator. Courthouses, with their three separate circulation systems (judicial, public, and detention) typically require a minimum of two elevators for each system, and may have an elevator ratio as low as 25,000 GSF per elevator. By contrast, a high-rise office-building ratio could be as high as 55,000 GSF per elevator. The cost per stop will vary based on the type, speed, capacity, number of front and rear openings, quality, special features, and cab finish allowance.

Typically, elevators serving five or fewer floors are hydraulic. Those serving 5 to 13 floors may be geared traction elevators. Those serving more than 13 floors should be gearless traction elevators. This basis of selection takes into consideration the capacity and speed of each system. Hydraulic elevators are slow and are impractical for serving more than six floors. The increased speed of a gearless traction elevator cannot be realized in a building fewer than 12 floors because there is no acceleration advantage until the cab travels more than 12 floors.

These systems range in cost from hydraulic at the low end to gearless traction at the high end. The cost of escalators may be justified only when there is heavy public traffic. For example, a pair of escalators connecting two floors can cost as much as a twelve-stop traction elevator.

7.3.10 Mechanical and Electrical Systems

Mechanical costs include heating, ventilation, and air conditioning (HVAC) systems, building management systems, and plumbing and fire protection systems. HVAC costs should be monitored by analyzing the GSF per ton of cooling and the cost per ton. Plumbing can be monitored by the cost per fixture. The controls system that manages the mechanical and electrical system can be monitored by number of points and cost per point. Fire protection can be monitored by cost / GSF.

Electrical costs have traditionally been monitored by the ratio of Watts/GSF. This measurement can be misleading because factors other than power have a significant impact on cost. Electrical costs are best monitored using a cost of electrical work per GSF, breaking out the cost of lighting (and associated wiring and controls). Lighting accounts for about a quarter of all electrical costs.

Data and telecommunications costs vary widely. Most construction budgets include the cost of conduit and raceways for data and telecommunications. The cost of wiring and devices is typically carried outside of the general construction budget. It is essential to understand where the funding for data and telecommunications work is carried in the overall project budget, and to coordinate

it with the general construction work to avoid installation problems, delays, and the attendant cost impact.

7.3.11 Bid and Construction Terms

Requirements established in Division One of the bid documents and construction contract documents impact project cost. When the bid and contract terms are clear, fair and equitable, the general contractor will typically respond with a more competitive bid. When this is not the case, or when projects have been bid several times, or funding has not been approved, the contracting community responds by increasing their bids. By using standardized, equitable, and clear contracts for construction, general conditions and profit can be projected more consistently.

The 15% allowance for General Conditions and Profit (which is industry standard for estimating) that is incorporated in the unit costs in the Benchmark Study, assume clear, fair, and equitable contract terms, and a competitive market.

7.4 ESTIMATING REVIEW PROCEDURES.

7.4.1 Introduction

This section provides estimating review procedures for use by Project Managers upon receipt of design submittals. It answers the questions:

- How do I review an estimate?
- What do I look for?
- What should it contain?
- How should it be presented?
- Does it appear to be an acceptable product?
- Can I trust it?

In the first instance, the level of detail and format should be as prescribed in PBS 3440.5 Project Estimating Requirements

The critical points for estimating review are at the Preliminary Concept, Final Concept, and Design Development submittals. The review of an estimate involves 1) checking its preparation for independence and balance; 2) checking its content for completeness and accuracy; and 3) checking its parameter quantities and unit pricing for adequacy.

To do this, the Project Manager must rely on checking the estimating submittal, 1) against the Courthouse Design Standards which were the basis for establishing the benchmark pricing system used to budget the project; 2) actual versus programmed areas, and 3) the best practice estimating standards for each stage of design.

These standards are provided below and are applicable to each design stage.

7.4.2 Estimate Review

Independence – Check to see that:

- Separate estimates with quantity take-offs are made for each separate concept submitted.
- The estimate for a second concept should not be a modification of the first concept. It should be a separate, complete stand-alone document.
- If a concept includes more than one structure, separate estimates of each are necessary. To lump the cost, for example, of the exterior wall system of two or three different structures into one cost number, defeats the analysis of unit pricing data.

Balance – Check to see that:

The estimate contains separate line items with prices for (at a minimum); foundation, structure, exterior closure, roofing, interior construction, elevators,

HVAC, plumbing, electrical and site work.

The estimating effort submitted for each discipline should be balanced. It should be evident that the effort is proportional in relationship to the system's cost. Lump sum amounts should be held to an absolute minimum.

Completeness – Check to see that:

- The estimate includes only the required court program of net usable square feet.
- Reflects the efficiency or GSF identified in the SOW.
- The estimate includes the proper number of courtrooms, detention cells, chambers, and parking spaces listed in the design program.
- Reflects the quantity of space type identified in the SOW.
- The concept drawings and design narrative do not contain something that is not included in the estimate.
- The prospectus and program documents do not contain something that is not included in the estimate.
- The estimate is complete listing prices for all building systems, site work, equipment, furnishings, tenant allowance, design contingency, contractor overhead and profit, and escalation to mid-point of construction.

For the estimate to be acceptable, it must include all relevant cost elements and all elements of the proposed project work. Completeness is aided by following the standard UNIFORMAT 2 system code of accounts, thus ensuring that no system is accidentally omitted.

Check to see that the estimate contains all of the "special systems" beyond those which may be required by the courts. These systems should be priced separately. Typical examples are:

- Sprinkler system
- Building management control system
- Fire alarm system
- Emergency Generator
- Raised flooring
- Security systems (CCTV, package x-ray, etc.)
- Carbon monoxide system (for parking areas)
- Voice / data conduit / cable tray system
- Window washing system
- Lighting protection system
- Power outlet grounding system

Accuracy – Check to see that:

- The quantities of items on the drawings match those in the estimate.

- Spot check items like number of parking stalls, number of windows, perimeter of building, height of building. Calculate yourself the exterior wall area. Computation should accurately reflect the concept being estimated.

- The materials indicated on the drawings and design narrative match those reflected in the estimate. (For example – stone veneer exterior closure, bullet resistant glazing, etc.)

- The systems indicated on the drawings and described in the design narrative match those reflected in the estimate. (For example – hydraulic elevators, sprinkler system, diesel emergency generator system, variable air volume HVAC system.)

- Multiplications and additions are correct.

While accuracy is desired, too much precision in presenting estimates can be misleading and more work than is warranted based upon the level of information and assumptions being made at the Concept Design stage. Therefore, it is appropriate to round off individual items to the nearest $1,000 at this stage.

Parameter Quantity Adequacy

Listed below are the parameter quantity target standards in brackets [ ] for typical Courthouses. Check each of the following to see how they are being met:

- Site Ratio – building footprint area divided by site area

  A larger ratio may mean that the site fencing, utility runs, landscaping and/or site improvements will cost more than normal. However, you should also gain increased security from larger setbacks.

- Space Efficiency – [67%] net usable area divided by gross square feet.

  A lower efficiency means more gross square foot has been designed than is typical to house the usable area.

- Exterior Skin Ratio – [45% - 55 %] area of exterior closure divided by gross square feet

  A higher ratio means there may be more exterior wall than is typical to enclose the given program. This may also increase the energy operating costs.

- Fenestration Ratio – [30% - 45%] area of glazing divided by area of exterior closure.

  A higher ratio increases the glazing costs, reduces security, and increases the operating cost for energy.

- LO/Story – [10] number of elevator landing openings divided by number of floor levels.

  A higher ratio increases cost for elevators, security and elevator maintenance.

- NSF/FU – [590] net square feet divided by number of plumbing fixture units.

  A lower ratio means there may be more plumbing fixtures than are normally necessary for court space.

- NSF/TON – [280] net square feet divided by tonnage of chiller capacity provided (not including spare chiller capacity).

  A lower ratio means project costs may have been increased by installing more cooling capacity than is needed for court space. The ratio can be raised by increasing the insulating capability of the roof and exterior enclosure; by reducing the exterior surface area of the building (perimeter and/or height); by reducing the amount of glazing; and by reducing the inside-outside design temperature differential.

- NSF/AMP – [55] net square feet divided by incoming amps of connected power.

  A lower ratio means project costs may have been increased by installing more power capacity and power distribution (feeders and panel sizes) than is needed for court space. The ratio can be raised by ensuring an energy efficient lighting system and power system at no more than 7 watts per square foot; by raising the diversification factor used in computing electrical loads; and by ensuring that spare capacity is no larger than 25% at all panel loads.

7.4.3 Unit Price Standards for Parameters.

Listed below are the unit price parameters developed from the Benchmark Study for low rise, mid-rise, and high-rise court construction and used to establish the benchmark pricing. Project cost for these systems should fall within a reasonable range of these unit prices:

System	Parameter	Low Rise	Mid-Rise	High Rise
Foundations	$/FPA	$18 - 20	$30 - 33	$56 - 62
Exterior Closure	$/SFSA	$ 40 - 52	$36 - 45	$54 - 59
Elevators	$/LO	$30,900 - 34,200	$24,800 - 27,500	$16,900 - 18,000
Plumbing	$/FU	$2,400 - 2,700	$2,200 - 2,500	$1,900 - 2,100
HVAC	$/TON	$$4,800 - 5,400	$5,000 - 5,600	$5,200 - 5,800
Electric Distribution	$/AMP	$860 - 950	$1,390 - 1,540	$1,310 - 1,460
Utilities	$/SFSA	$7.40 - 8.20	$11.00 - 12.10	$30.60 - 33.80

Parameter Definitions

FPA – footprint area
SFSA – square foot surface area
LO – landing openings
FU – fixture units
TON – ton (12,000 btuh)
AMP – ampere of connected load

7.4.4 Other Contingencies

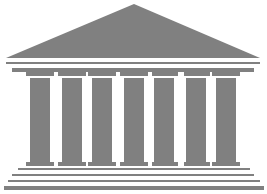
Design Contingency

A design contingency should not be included in either the ECCA or ECC cost build-up. However, it is appropriate for a design contingency to be included in the cost estimate submittals throughout the design phases. The design contingency is an allocation *within the overall cost budget* and should typically be around 10% at the concept phase gradually diminishing to 2.5% - 5% at the construction documents phase. The purpose of this contingency is solely for cost planning and to allow for the cost of design decisions that have not or cannot be fully expressed at the particular phase of design.

Phasing Contingency

It is not normally anticipated that new projects will be built in phases. However, projects that will be built in phases should include a Phasing Contingency to cover the cost of temporary partitions, multiple mobilizations and demobilizations, additional cost of labor for work done other than during normal working hours, as well as other costs incurred during a phased construction project.

ATTACHMENT



Center for Courthouse Program (PCC)
Items Included in the Benchmark

December 6, 2002

The current Benchmark formula was established utilizing the results of a cost study prepared by SmithGroup/Hanscomb. This Benchmark Cost Study was based on the estimated FY2001 (October 2000) costs of four 100% designed courthouse projects (Laredo, Tucson, Jacksonville, Omaha). The study identified target ratios for key design elements as barometers for a typical courthouse project. These ratios may be used as targets when developing the final building design. These ratios, where exceeded, may alert the Project Manager that costs could run higher than benchmarked. The key ratios used to develop the benchmark are:

- Space efficiency ratio- Target 67% (net usable area divided by gross square feet)
- Exterior skin ratio- Target 45%-55% (area of exterior enclosure divided by gross square feet)
- Fenestration ratio-Target 30%-45% (area of glazing divided by area of exterior closure)

There are other program and pricing elements in the benchmark that are important to identify.

Note: Some elements may be included in the ECCA, but may need to be held aside for procurement outside the general construction contract award. See items marked (*) below.

Depending on pricing policies, some allowances or unit costs are shown in the CS portion, and some in the TI portion.

- An allowance of 2.5% is included in the ECCA to support the cost of Sustainable Design to a Silver LEED rating.

- An allowance of 0.5% is included in the ECC to provide for the Art in Architecture program.

- $9.00/Bldg gsf is in the ECCA TI unit cost for a 12”-18” raised floor.

- FPS perimeter security including camera and FPS console and monitor(s) .75/Bldg gsf in the ECCA. **(*)**

- Security requirements for construction cost increases to level C construction, including allowances for hardening of uncontrolled spaces, progressive collapse, security infrastructure, and curtain wall upgrade $23.00/bldg gsf in the ECCA (carried in the CS unit costs).

- Audio system and courtroom furniture $56,800 per courtroom in the ECCA **(*)**

- Overhead (10%) and Profit (5%) are in the ECCA

- **USMS electronics package including equipment $2.00/bldg GSF in the ECCA(*)**

- USMS security console and monitors $200,000, plus escalation, per courthouse in the ECCA **(*)**

- $7.00 /bldg GSF for site development in the CS unit costs

- The ECC includes a 5% construction contingency

The following items have been considered, but were not included in the Benchmark formula at this time.

- The GCCRG is considering an allowance of $1.50 per building gross square foot to accommodate improved humidity control systems in the mechanical design of the building. Since this represents less than .5% of the current benchmark costs, and the Benchmark is still running 4%-5% higher than the GCCRG models, **the PCC Benchmark will not be increased.** The Benchmark is sufficient to cover the cost of these systems

- An allowance for increased USDC mailroom requirements. (Currently under review to develop estimate of cost). Note: Costs will be added only if USDCDG is modified to reflect new requirements and space is added to any court request. Currently AOC has indicated they will not be modifying the USDCDG in time to include funds in benchmarks for 05. **Projects will have to receive an RWA from the AOC.**